

Common Drainage Culvert  
Beneath Going-to-the-Sun Road, approximately  
8.75 miles northeast of the park entrance  
at West Glacier  
Glacier National Park  
Flathead County  
Montana

HAER No. MT-69

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15-WEGLA,  
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WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record  
National Park Service  
Department of the Interior  
Washington, DC 20013-7127

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# HISTORIC AMERICAN ENGINEERING RECORD

## COMMON DRAINAGE CULVERT HAER MT-69

**Location:** Passing under the Going-to-the-Sun Road, approximately 8.75 miles northeast of the park entrance at West Glacier, Glacier National Park, Flathead County, Montana  
UTM: Lake McDonald West Quad. 12/281200/5380250

**Date of Construction:** 1936 or 1937

**Structural Type:** Typical concrete drainage culvert

**Contractor:** Williams & Douglas, Tacoma, Washington

**Engineer:** Bureau of Public Roads

**Owner:** Glacier National Park

**Use:** Road culvert

**Significance:** The Common Drainage Culvert is one of approximately seventeen prominent masonry and concrete structures on Going-to-the-Sun Road in Glacier National Park. The 51-mile stretch of scenic road is significant as a unique engineering accomplishment of the early twentieth century, and as the first product of a 1925 cooperative agreement between the National Park Service and the Bureau of Public Roads. This particular culvert is representative of the tens of thousands of linear feet of drainage culvert which lie beneath the surface of the road.

**Project Information:** Documentation of the Common Drainage Culvert is part of the Going-to-the-Sun Road Recording Project, conducted during the summer of 1990 under the co-sponsorship of HABS/HAER and Glacier National Park. Researched and written by Kathryn Steen, HAER Historian, 1990. Edited and transmitted by Lola Bennett, HAER Historian, 1992.

For measured drawing, see HAER MT-67B, sheet 1.

### Going-to-the-Sun Road

The drainage culverts are perhaps the most pervasive, but overlooked, structures on Going-to-the-Sun Road, a scenic park road that winds through the spectacular mountains and valleys in the middle of Glacier National Park. The 51-mile road, built in sections between 1911 and 1933, and rebuilt during the next two decades, runs across the central portion of the park from east to west. Starting in the west, the road runs from West Glacier, along the 10-mile eastern shore of Lake McDonald and then up McDonald Creek for an additional ten miles. About one mile beyond the junction with Logan Creek, the road begins its ascent to Logan Pass. The road climbs at a 6-percent grade, passes through a tunnel, and turns at a major switchback called "The Loop." Following the contours of the sides of Haystack Butte and Pollock Mountain, the road passes over several bridges, culverts, and retaining walls, before reaching Logan Pass. Beyond the Pass, the road descends to the east along the sides of Piegan Mountain and Going-to-the-Sun Mountain before running along the north shore of St. Mary Lake. The road exits the park as it crosses Divide Creek near St. Mary, Montana.<sup>1</sup>

### Significance of the Road

Going-to-the-Sun Road is significant as an outstanding engineering feat of the early twentieth century. In addition, the road was the first product of the interagency cooperative agreement between the National Park Service (NPS) and the Bureau of Public Roads (BPR). The agreement, signed in 1925, allowed the National Park Service to utilize the roadbuilding expertise of the Bureau of Public Roads while still retaining control to protect the landscape.<sup>2</sup>

### Common Drainage Culvert

Following the agreement with the BPR, the standards of road construction became much higher. The width of road increased, the number of sharp turns decreased, and structures along the road were made of more permanent materials. Starting in 1925, the NPS and BPR required the contractors on Going-to-the-Sun Road to use the more permanent materials in the road's drainage culverts. The BPR provided specifications for corrugated iron pipe culverts and their masonry headwalls. The specifications sheet contained tables listing various sizes of pipe culverts that might be necessary on the road--diameters ranging from 12" to 120". The sheet also listed specifications for small reinforced concrete culverts.<sup>3</sup>

In the years before the Bureau of Public Roads became involved in the park, the park built their culverts with cedar logs. Within a decade, many of the culverts had failed and several others were nearing failure or were plugged. The culverts were particularly vulnerable when they were at the base of steep slopes such as along Lake McDonald. In addition, freezing winters took their toll on the culverts.<sup>4</sup>

To some extent, the location of drainage culverts could be planned on paper prior to construction. Engineers knew they needed to consider factors

such as the size of the drainage area, the steepness of the slope, the type of soil, and the local rainfall. They could gather much of their information from topographic maps or existing data collections. The engineer, however, still depended on visits to the field for final placement of the culvert. In determining the size of the culvert, the engineer could examine previously gathered information on water flow or high water marks. If this information did not exist, the planning engineer could resort to one of several empirical formulas which utilized readily measurable variables.<sup>5</sup>

Recommended practice required building headwalls at both ends of the culvert. In addition, the contractor would ideally construct the base of the headwall about 18" below the pipe to prevent the headwall from washing out.<sup>6</sup> On Going-to-the-Sun Road, often only one end of the culvert had a headwall. Glacier National Park headwalls conformed with BPR standards for headwalls, but they also needed to fit the National Park Service policy to use native materials. Most of the stone used in the road's structures came from rock excavated during construction or from a quarry at some point along the road. Much of the rock used in the 1930s came from a quarry near Haystack Creek, 5½ miles west of Logan Pass.<sup>7</sup>

Many sizes of corrugated pipe culverts became part of the drainage system for Going-to-the-Sun Road. Between 1925 and 1937, the primary period of major construction and reconstruction, the various contractors installed over 30,000 linear feet of culvert.<sup>8</sup>

#### Description

The chosen drainage culvert, given in the UTM number on the title page, has an 18"-diameter corrugated metal pipe running under the road and a stone masonry headwall. The headwall is 5'-0" wide and 2'-7" high.

ENDNOTES

1. See the Historic American Engineering Record report HAER MT-67 on the Going-to-the-Sun Road.

2. C.H. Purcell, F.A. Kittredge, J.A. Elliott, T.C. Vint, and C.J. Kraebel, Suggested Procedure for Cooperation Between the National Park Service and the Bureau of Public Roads in Major Traffic-Way Projects Within the National Parks, April 22, 1925 (Record Group 79, National Archives, Washington, D.C.)

3. "Standard Details for Pipe Culverts and Drainage, May 1935," plan located in the Glacier National Park Library.

4. "Final Construction Report, 1931, Post Construction--Slide Removal," located in the Glacier National Park Library Historical Files.

5. Arthur H. Blanchard and Roger L. Morrison, Elements of Highway Engineering, second edition (New York: John Wiley and Sons, Inc., 1928), pp. 307-312.

6. Blanchard and Morrison, pp. 311-312.

7. Purcell, et al, Suggested Procedure.

8. Figure is compiled from Final Construction Reports, located in the Glacier National Park Library Historical File.

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Second edition. New York: John Wiley and Sons, Inc., 1928.

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Purcell, C.H., F.A. Kittredge, J.A. Elliott, T.C. Vint, and C.J. Kraebel.  
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and the Bureau of Public Roads in Major Traffic-Way Projects Within the  
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